Useful suggestions for laying out, planting and cultivating a garden and grounds are given by Mr. T. W. Sanders in the second number of the series of rural handbooks in course of publication by Messrs. Dawbarn and Ward. Seven plans are given for laying out plots varying in area from a quarter of an acre to ten acres; and anyone free to follow the designs set forth, and capable of waiting patiently for the trees and shrubs to develop, may act with advantage upon the concise instructions which Mr. Sanders gives.

A cheap edition (price *6d.*) of Laing's "Modern Science and Modern Thought," revised and brought up to date, with a biographical note by Mr. Edward Clodd, has been issued for the Rationalist Press Association by Messrs. Watts and Co. With reference to the revision which the advance of knowledge during the last seventeen years has rendered necessary, Mr. Clodd remarks:—"The portions thus affected are those dealing with the continuity of Palæolithic and Neolithic man in Continental Europe; with the recent discovery of remains, probably of an intermediate form between man and ape, in Java; and with the remarkable discoveries in Babylonia, which appear to accord to that empire on earlier civilisation than that of Egypt."

Mr. Benjamin Kidd is leaving England shortly for South Africa, in connection with studies on which he is engaged. Since the publication of "Principles of Western Civilisation" he has been occupied with articles of some length for the "Encyclopædia Britannica." One of these deals with the application of the doctrine of evolution to society. The article on sociology in the new edition will be contributed by Mr. Kidd.

The question as to whether tellurium or iodine possesses the larger atomic weight has given rise to many researches since Mendeléeff pointed out that the conclusion drawn from the periodic system was opposed to the experimentally determined facts. This work has hitherto been principally devoted to tellurium, partly because as the rarer and lesser known element tellurium might possibly contain elements of higher atomic weight, but chiefly because the work of Stas in regard to iodine appeared so convincing that further determinations of this constant for iodine would be superfluous. Since all the work done on tellurium tends to show that its atomic weight is decidedly higher than that of iodine, Prof. Ladenburg has attacked the question from the other side, and has redetermined the atomic weight of iodine, using methods of purification differing from those adopted by Stas; the result is in almost absolute agreement with the usually accepted figure, so that the discrepancy between the conclusions of the periodic law and the results of experiment still remains unexplained.

The current number of the *Berichte* contains a paper by Dr. W. Marckwald on polonium, the radioactive constituent of bismuth. The discoverers of these radioactive elements, M. and Mme. Curie, after numerous attempts to isolate this element, concluded that polonium is a species of active bismuth, and that there is as yet no proof that it contains a new element. Dr. Marckwald, after numerous fruitless experiments, has succeeded in obtaining a minute amount of polonium in a manner which would appear to exclude the possibility of its identity with bismuth. Starting with some kilograms of residues from pitchblende, about 1 per cent. of strongly radioactive bismuth oxychloride was obtained, and it was proved that this activity remained unchanged after several months. The acid solution of this was then treated with a stick of pure metallic bismuth, the metal becoming after some time coated with a black deposit. It was found that the activity of this deposit, as measured by the electroscope, far exceeded that of the original solution, the residual solution having lost its activity during the deposition. No deposit was seen when a second stick of bismuth was placed in this exhausted solution. The total weight of polonium obtained was only 5 milligrams, corresponding to an amount not exceeding 1 gram per ton of pitchblende. The author hopes to be able to obtain sufficient material to carry out an atomic weight determination.

Although the fact of the existence of a gaseous antimony hydride has been known for many years, it is only comparatively recently that it has been obtained in the pure state, and the accounts of the stability of the pure hydride differ considerably. Thus, according to Olszewski, who first succeeded in solidifying the gas, decomposition with separation of antimony occurs readily even at - 90° C. The current number of the *Berichte* contains a paper on this subject by A. Stock and W. Doht. In order to obtain as rich a gas as possible, they made a careful study of the composition of the gas evolved from a series of alloys of antimony with zinc, sodium, calcium and magnesium, and they found that the magnesium alloy was much the best for the purpose. Thus, whilst the zinc-antimony alloys never yielded a gas containing more than 1 per cent. of the hydride, an alloy of one part of antimony with two of magnesium gave hydrogen containing from 10·4 to 14 per cent. of the antimony hydride. From this mixture the pure gas was easily solidified out with liquid air, melting at - 88° C. and boiling at - 17° C. The solid melts to a clear liquid, and evaporates without leaving any trace of antimony, and, in fact, the gas may be kept at the ordinary temperature for some hours before decomposition sets in.

The additions to the Zoological Society's Gardens during the past week include a Brown Capuchin (*Cebus fatuellus*) from Guiana, presented by Madame Delmas; two Ocelots (*Felis pardalis*), two Common Boas (*Boa constrictor*) from South America, presented by Captain W. H. Lacy; two Giraffes (*Giraffa camelopardalis*, ♂ ♀) from Kordofan, two Cheetahs (*Cynoelurus jubatus*), three Secretary Vultures (*Serpentarius reptilivorus*) from Africa, presented by Colonel Mahon; a Green Woodpecker (*Gecinus viridis*) British, presented by Mr. J. T. Jones; a Roseate Cockatoo (*Cacatua roseicapilla*) from Australia, presented by Miss Ina King; five Lions (young) (*Felis leo*), two Grévy's Zebras (*Equus grevyi*, ♀ ♀) from Southern Abyssinia, a Campbell's Monkey (*Cercopithecus campbelli*) from West Africa, five Pratincoles (*Glareola pratincola*), European, two Lesueur's Terrapins (*Malacoclemmys lesueuri*), two prickly Trionyx (*Trionyx spinifer*), an Alligator Terrapin (*Chelydra serpentina*) from North America, two Striated Snake-head Fish (*Ophiocephalus striatus*) from India, two Egyptian Geese (*Chenalopex aegyptiacus*) from Africa, deposited; an Ourang-Outang (*Simia satyrus*) from Borneo, two Golden-backed Woodpeckers (*Brachypternus aurantius*), an Indian Roller (*Coracias indica*) from India, two White-eyebrowed Guans (*Penelope superciliaris*) from South-east Brazil, purchased; a Duke of Bedford's Deer (*Cervus xanthopygius*) born in the Gardens.

OUR ASTRONOMICAL COLUMN.

Bright Meteor of July 13.—Several correspondents send particulars of a brilliant meteor observed over a wide area last Sunday evening, July 13, about 10.30. According to charts sent by Prof. F. J. Allen from Cambridge, and Mr. A. Macrae from Crouch End, the meteor, which was probably sporadic, first appeared at an altitude of about 40°, and travelling in a N.E.-S.W. direction crossed a line joining Jupiter and Markab at right angles, at about 25° from the former. The meteor travelled very quickly and was intensely bright. Prof. Allen says:—"It illuminated the landscape like a considerable flash of lightning, though the moon shone and incandescent lights were near." Its colour is given as "violet-white." Mr. C. Waterer, of Margate, also remarks:—"It lighted up the whole

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landscape in a remarkable manner, and seemed to glow with a peculiarly steady light." Mr. C. G. Osborne, who saw the meteor at Godalming, says that the light was so brilliant that people in a large hall thought a flash of lightning had occurred.

The trail, which was about 10° long and lasted for 15–20 seconds, is described as being of a violet and blue colour, and before extinction it became quite sinuous.

The Rev. F. J. Jervis-Smith, who observed the meteor at Iffley, near Oxford, sends the following notes of his observation:—"Time, 10.30 p.m., July 13. Approximate angle subtended by total length of luminous path about 15°. Line of flight downwards and nearly vertical. Bearing E.S.E. Angle between its highest point and the horizon about 45°. Time of duration about 2½ seconds."

Mr. Walter E. Besley, director of the meteoric section of the British Astronomical Association, states in the *Times* that the course of the meteor was from R.A. 311° and north declination 21° to R.A. 310½° and north declination 16½°.

DISCOVERER OF NOVA PERSEI.—At a meeting of the Société Astronomique held on July 4, M. Flammarion informed the members that it was one of their number, M. A. de Borissiak, a student at Kieff, who first observed Nova Persei. This observer recorded the Nova as being equal in magnitude to β Geminorum at 8 p.m. February 21, 1901 (Pulkowa time), and, taking into account the difference of longitude, this was about 8h. 40m. before Mr. Anderson discovered it.

The Russian Government has presented M. Borissiak with a special medal for this discovery (*Bulletin de la Société Astronomique de France*, July).

NOVA PERSEI.—The fourth report (June 1902) of the Variable Star Section of the British Astronomical Association, is devoted to a memoir in which Colonel Markwick has gathered together all the observations of the members on the magnitude, colour, light curve and spectrum of Nova Persei. The memoir contains several maps and charts of the region about the Nova, some very good light curves compiled, from many observations, by Mr. J. E. Gore and a series of excellent photographs of the Nova itself obtained by Mr. Alex. Smith at Dalbeattie, using a 5¼-inch doublet at various foci, sometimes with full aperture and sometimes with only half (*i.e.* a semicircular) aperture.

HONG KONG DOUBLE STAR OBSERVATIONS.—Nos. 3798–99 of the *Astronomische Nachrichten* are mainly devoted to the observations of 200 double stars made by Mr. W. Doberck at Hong Kong.

Mr. Doberck describes his instrument, which seems to be an ancient one, and shows how the somewhat necessarily large errors have been eliminated. He insists that observations of the same double star should be separated by fairly long intervals in order to render them quite independent of each other, and contends that stellar objects should always be designated by the initial and number of the discoverer, and not by any reference to a general catalogue.

OBSERVATIONS OF THE VARIABLE STAR χ^2 CYGNI DURING 1899.—M. Blum publishes in the *Bulletin de la Société Astronomique de France* an account of the observations of this star made during 1899 by MM. Ed. de Perrot and P. Sella.

The two sets of results and the curves plotted therefrom show very fair agreement, and M. Sella deduces the following conclusions from them:—

(1) The star is visible to the naked eye 3 days before and 30 *days after* the theoretical times.

(2) It increases to maximum (4·7) very rapidly, viz. in 17 days, but decreases very slowly.

(3) There exists a second maximum (4·8) about 28 days after the first, a third maximum (5·0) 16 days later than the second, and a fourth maximum about 18 or 19 days later than the third. The respective dates of observation were May 10, June 7, June 23 and July 11–12.

The complete range of variability of this star is about 8 magnitudes.

ROTATION OF THE BRIGHTER FIXED STARS, AS A WHOLE, WITH RESPECT TO THE FAINTER STARS.—In No. 3800 of the *Astronomische Nachrichten*, Sir David Gill communicates a preliminary note on the apparent rotation of the brighter fixed stars, taken as a whole, in regard to the fainter fixed stars, taken as a whole.

After comparing the common data given in the Cape Catalogues of 1880 and 1900, Newcomb's Fundamental Catalogue for 1900, Taylor's and other catalogues, and carefully correlating and eliminating the personal errors therein, the author arrives at the conclusion that the remaining discrepancies can only be accounted for by supposing the above-mentioned rotation.

The author urges that the greatest care should be taken to eliminate all the errors in reducing plates for the Astrographic Chart, and suggests that the Repsold-Struve method for magnitude correction, described by Cohn in the *Astronomische Nachrichten*, No. 3766, should be used.

PHOTOGRAPHIC MAGNITUDE OF STARS.—In a note to the Paris Académie des Sciences, M. Prosper Henry points out the effect of the influence of magnitude in causing errors, small but effective, in the reduction of stellar negatives.

Dissatisfied with the final utility of the method proposed by Sir David Gill in the *Bulletin du Comité de la Carte du Ciel*, he proposes a method where duplicate images of the same region are obtained very near together on the same negative, the one with a very short exposure, the other with a long exposure, and then by means of a formula in which the only variables are n, g' and g, he finds the quantity $\frac{n}{g' - g}$, which is the variation of the scale for a difference of one magnitude in the scale of magnitudes adopted, $g' - g$ being the difference in magnitude between the images obtained by the two different exposures. One advantage of this method is that it is not necessary to reduce the coordinates of the plate to right ascension and declination, neither is it necessary to correct for refraction unless the two exposures were made very far apart, and at some distance from the meridian.

MARINE BIOLOGY IN WALES.

AS announced last week, Mr. G. W. Duff Assheton-Smith, of Vaynol Park, Bangor, who has for many years taken a warm interest in the zoological department of the University College of North Wales, has offered a site to the College for a marine zoological station, on condition that the maintenance of the station when erected is assured. The fine zoological collection at the College bears ample testimony to Mr. Assheton-Smith's interest, as he has frequently enriched it with valuable specimens from his menagerie at Vaynol. The site spoken of is on the Menai Straits, about midway between Bangor and the suspension bridge. Sheltered and beautifully situated, it is from every point of view the best site in the locality on which to place such an institution. Besides giving the site with his rights to the foreshore, Mr. Assheton-Smith will also give the necessary facilities of access through his property. In the laboratory, aquarium and enclosures, which will be features of the station, investigations and experiments in connection with our fisheries will be instituted and carried out. The Menai Straits possess a peculiarly rich fauna, and material is always available for investigation and experimental purposes.

A brief note on the steps which have led up to this development may not be out of place. When, in 1892, the Liverpool Marine Biological Committee decided to vacate the station on Puffin Island and to take up its headquarters at Port Erin, Prof. Herdman offered, on behalf of his committee, to dispose of the Puffin Island station to Prof. White. Being unwilling to allow an institution of this nature so near to his college to lapse, and at the same time being desirous of continuing the work of the station as far as possible, Prof. White, with the cooperation of some of his colleagues, provided the money to acquire it. With the assistance of friends he also raised a small income for the maintenance of the building, for carrying on the work and for the publication of reports. A committee for investigating the fauna and flora of the coast of North Wales, and for promoting the sea fisheries, was formed and the work began. An account of the work accomplished is given in the various reports which have been issued.

The inaccessibility of the island, and other obvious difficulties connected with an isolated position, frequently presented themselves, and these led Prof. White to cast round for a more suitable situation, with the result as noted.

In addition to the promise of a site, the College obtains the professional services of an accomplished architect—Mr. Harold Hughes, of Bangor—free. Mr. Hughes took much interest in the Puffin Island station, and both he and Prof. White made some interesting excavations to elucidate the past history

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